SILICON N-CHANNEL DUAL GATE MOS-FET

Depletion type field-effect transistor in a plastic X-package with source and substrate interconnected. Intended for UHF applications, such as UHF television tuners, with 12 V supply voltage and professional communication equipment.
This MOS-FET tetrode is protected against excessive input voltage surges by integrated back-to-back diodes between gates and source.

QUICK REFERENCE DATA

Drain-source voltage	V_{DS}	max.	18	V
Drain current (DC)	I_D	max.	30	mA
Total power dissipation up to T_{amb} = 75 °C	P_{tot}	max.	225	mW
Junction temperature	T_j	max.	150	°C
Transfer admittance at f = 1 kHz I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V	$\|y_{fs}\|$	typ.	19	mS
Input capacitance at gate 1; f = 1 MHz	C_{ig1-s}	typ.	2.6	pF
		max.	3.0	pF
Feedback capacitance at f = 1 MHz I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V	C_{rs}	typ.	25	fF
Noise figure at G_S = 5 mS; B_S = B_S opt I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V; f = 800 MHz	F	typ.	2.0	dB

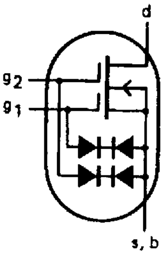
MECHANICAL DATA

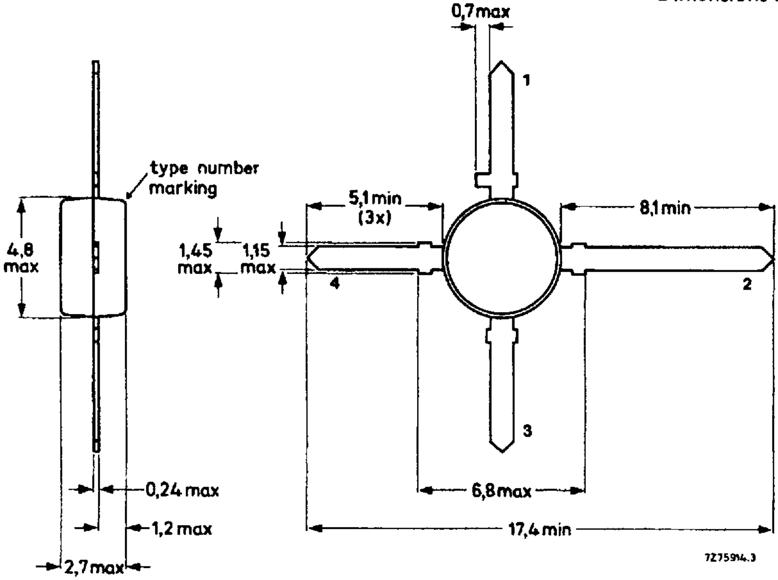
Dimensions in mm

Fig.1 SOT103.

Pinning

1 = source
2 = drain
3 = gate 2
4 = gate 1





RATINGS

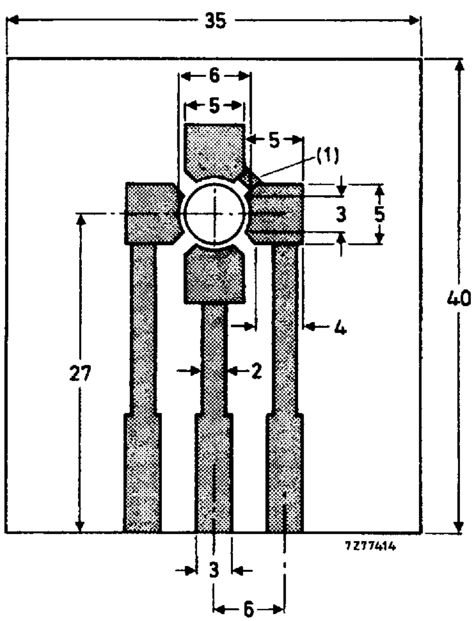
Limiting values in accordance with the Absolute Maximum System (IEC 134)

Drain-source voltage	V_{DS}	max.	18	V
Drain current (DC or average)	I_D	max.	30	mA
Gate 1 - source current	$\pm I_{G1\text{-}S}$	max.	10	mA
Gate 2 - source current	$\pm I_{G2\text{-}S}$	max.	10	mA
Total power dissipation up to T_{amb} = 75 °C	P_{tot}	max.	225	mW
Storage temperature range	T_{stg}	−65 to + 150		°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to ambient in free air mounted on the printed-circuit board (see Fig.2)	$R_{th\,j\text{-}a}$	=	335	K/W

Dimensions in mm



(1) Connection made by a strip or Cu wire.

Fig.2 Single-sided 35 μm Cu-clad epoxy fibre-glass printed-circuit board, thickness 1.5 mm. Tracks are fully tin-lead plated. Board in horizontal position for R_{th} measurement.

STATIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Gate cut-off currents			
$\pm V_{G1\text{-}S}$ = 7 V; $V_{G2\text{-}S} = V_{DS}$ = 0	$\pm I_{G1\text{-}SS}$	max.	25 nA
$\pm V_{G2\text{-}S}$ = 7 V; $V_{G1\text{-}S} = V_{DS}$ = 0	$\pm I_{G2\text{-}SS}$	max.	25 nA
Gate-source breakdown voltages			
$\pm I_{G1\text{-}SS}$ = 10 mA; $V_{G2\text{-}S} = V_{DS}$ = 0	$\pm V_{(BR)G1\text{-}SS}$		8 to 20 V
$\pm I_{G2\text{-}SS}$ = 10 mA; $V_{G1\text{-}S} = V_{DS}$ = 0	$\pm V_{(BR)G2\text{-}SS}$		8 to 20 V
Gate-source cut-off voltages			
I_D = 20 μA; V_{DS} = 10 V; + $V_{G2\text{-}S}$ = 4 V	$-V_{(P)G1\text{-}S}$	min. max.	0.2 V 1.3 V
I_D = 20 μA; V_{DS} = 10 V; $V_{G1\text{-}S}$ = 0	$-V_{(P)G2\text{-}S}$	min. max.	0.2 V 1.1 V

DYNAMIC CHARACTERISTICS

Measuring conditions (common source): I_D = 10 mA; V_{DS} = 10 V; + $V_{G2\text{-}S}$ = 4 V; T_{amb} = 25 °C

Transfer admittance at f = 1 kHz	$\lvert y_{fs} \rvert$	min. typ.	18 mS 19 mS
Input capacitance at gate 1; f = 1 MHz	$C_{ig1\text{-}s}$	typ. max.	2.6 pF 3.0 pF
Feedback capacitance at f = 1 MHz	C_{rs}	typ. max.	25 fF 35 fF
Output capacitance at f = 1 MHz	C_{os}	typ.	1.1 pF
Noise figure at f = 800 MHz; G_S = 5 mS; $B_S = B_S$ opt	F	typ. max.	2.0 dB 3.0 dB

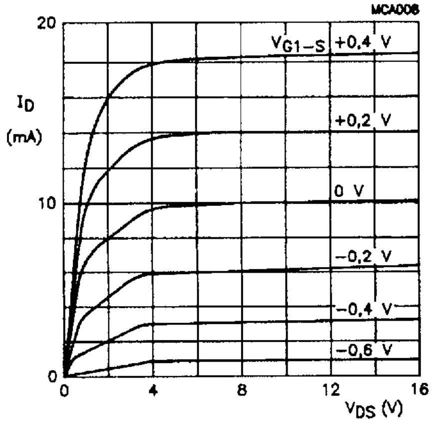


Fig.3 Output characteristics.
V_{G2-S} = 4 V; T_{amb} = 25 °C.

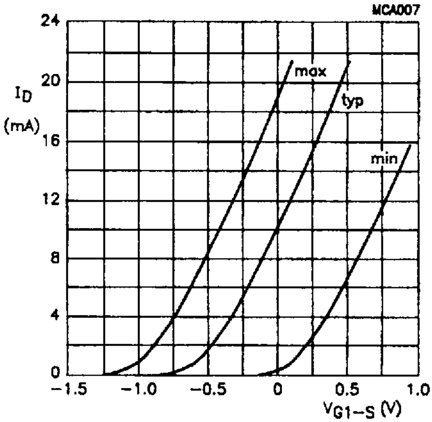


Fig.4 Transfer characteristics.
V_{DS} = 10 V; V_{G2-S} = 4 V;
T_{amb} = 25 °C.

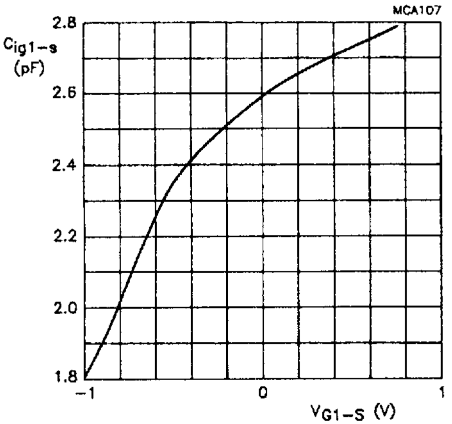


Fig.5 Gate 1 input capacitance as a function of gate 1 source voltage;
f = 1 MHz; V_{DS} = 10 V; V_{G2-S} = 4 V;
T_{amb} = 25 °C.

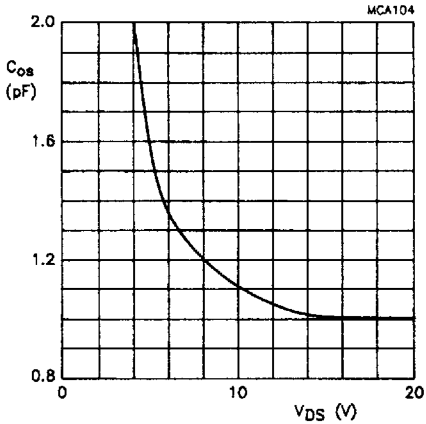


Fig.6 Output capacitance as a function of drain voltage; f = 1 MHz;
I_D = 10 mA; V_{G2-S} = 4 V;
T_{amb} = 25 °C.

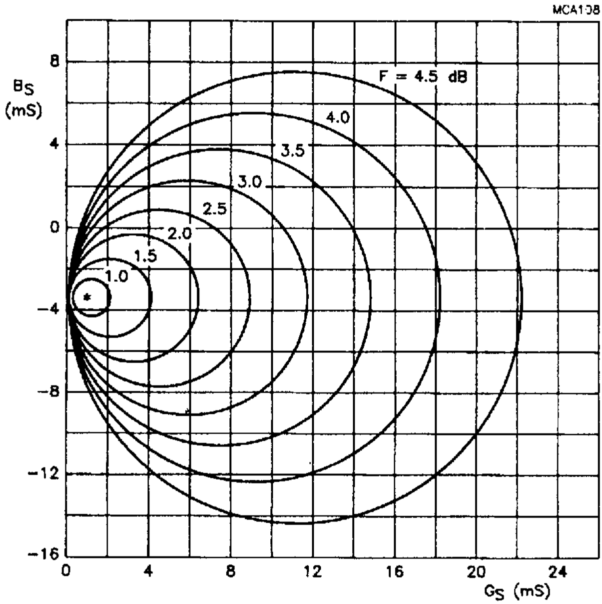


Fig.7 Circles of constant noise figures; f = 200 MHz; T_{amb} = 25 °C; V_{DS} = 10 V; $V_{G2\text{-}S}$ = 4 V; I_D = 10 mA.

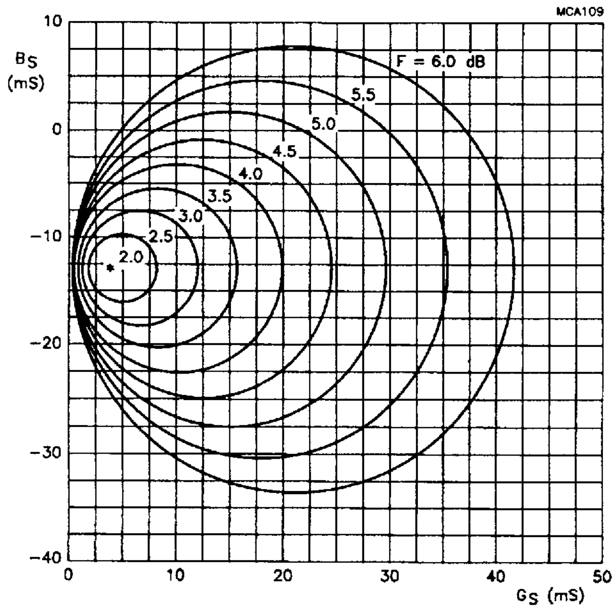


Fig.8 Circles of constant noise figures; f = 800 MHz; T_{amb} = 25 °C; V_{DS} = 10 V; $V_{G2\text{-}S}$ = 4 V; I_D = 10 mA.

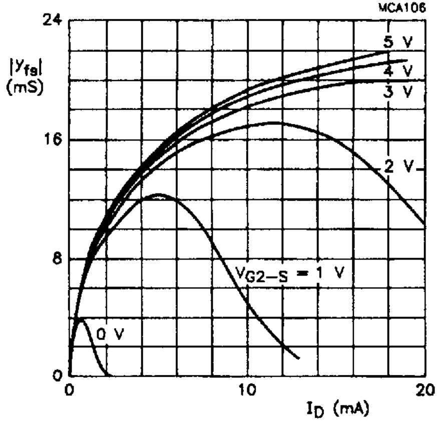


Fig.9 Forward transfer admittance as a function of drain current; f = 1 kHz; V_{DS} = 10 V; T_{amb} = 25 °C.

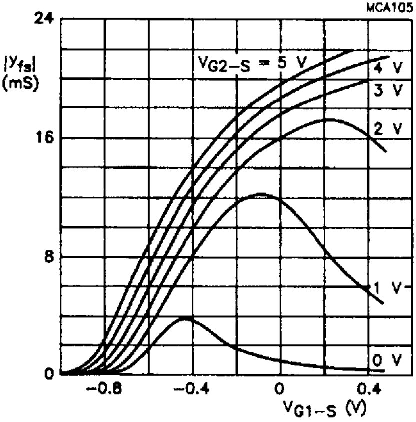


Fig.10 Forward transfer admittance as a function of gate 1 source voltage; f = 1 kHz; V_{DS} = 10 V; T_{amb} = 25 °C.